HON PRECALCULUS Name:_____

Common Algebra Errors (and some Very Important Algebra Properties)

Algebra is a language with its own **syntax**, **grammar** and **conventions**. Sometimes, these can seem arbitrary. Fortunately, since algebra is just generalized arithmetic, we should never have to just accept a property as "the rule"- we can always fall back on examples with specific numbers to support our reasoning.

Mark each of the following algebraic "properties" *TRUE* or *FALSE*. If false, give a counterexample. (Hint: there are 9 true properties and 12 false statements…)

1. $ab + ac = a(b + c)$

2. $\sqrt{a^2 + b^2} = a + b$

3. $\dfrac{a}{b + c} = \dfrac{a}{b} + \dfrac{a}{c}$

4. $\dfrac{1}{a^2} = a^{\frac{1}{2}}$

5. $\dfrac{a - b}{c - d} = \dfrac{b - a}{d - c}$

6. $\dfrac{a + b}{c} = \dfrac{a}{c} + \dfrac{b}{c}$

7. $a(b \cdot c) = (ab)(ac)$

8. $ab^{\frac{1}{2}} = \sqrt{ab}$

9. $\dfrac{a}{b} + \dfrac{c}{d} = \dfrac{ad + bc}{bd}$

10. $\dfrac{\left(\dfrac{a}{b}\right)}{\left(\dfrac{c}{d}\right)} = \dfrac{ad}{bc}$

11. $a - b(c - d) = a - bc - bd$

12. $\dfrac{\left(\dfrac{a}{b}\right)}{c} = \dfrac{ac}{b}$

13. $a\left(\dfrac{b}{c}\right) = \dfrac{ab}{c}$

14. $\sqrt{-a^2 + b^2} = -\sqrt{a^2 - b^2}$

15. $\dfrac{ab + c}{a} = b + c$

16 $\left(a^2\right)^3 = a^5$

17. $a^2 \cdot a^3 = a^6$

18. $(a + b)^2 = a^2 + b^2$

19. $\dfrac{ab + ac}{a} = b + c$

20. $\dfrac{\left(\dfrac{a}{b}\right)}{c} = \dfrac{a}{bc}$

21. $\dfrac{a}{\left(\dfrac{b}{c}\right)} = \dfrac{ac}{b}$